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THE RELATIONSHIP BETWEEN NON-COMMUNICABLE DISEASES HISTORY AND HEALTH-RELATED QUALITY OF LIFE

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Abstract

Disaster-prone population is vulnerable for suffering non-communicable diseases (NCDs) which become risk factors for poor quality of life (QoL). The study aims at investigating the effect of history of NCDs to the QoL. QoL was measured by WHODAS. NCDs with prevalence more than 1% were involved in analysis. Those NCDs included shortness of breath, diabetes, hypertension, joint disease and stroke. Among 1,872 respondents of Riskesdas, 7.7% of them have a poor QoL, suffering hypertension (8.7%), shortness of breath (7.3%) and asthma (6.9%). Risks of poor QoL six times higher among those with a history of PTM (PORadj 5.987; 95% CI 4.210-8.514) after adjusted by age, gender, education, socioeconomic status and region of residence. Stroke gives the greatest impact with POR 25.00 (95% CI 10.406 to 60.063). We recommend that the promotion and prevention of NCDs should be integrated with both mitigation-related and community resilience activities to disasters.

Introduction

World Health Organization (WHO) defines good health as a condition possessed by an individual who is not only free from any disease but also physically, mentally and socially prosperous (Romero, 2013). The main objective of healthy conditions is to make sure that individuals can enjoy the quality of life (IHE, 2008). This is a concern of policy-makers, researchers and health practitioners (Bakas, 2012). Therefore, measurement of the health-related quality of life of an individual emerges as one of the health assessments. The assessment is viewed from the perspective of the individual (subjective) (IHE, 2008; Skevington, 2004) and it encompasses several dimensions: physical, social, psychological and spiritual dimensions.

The study of health-related quality of life has increased in recent decades. This begins with the measurement of health-related quality of life in patients with non-communicable disease (NCDs) which aims to determine the impact of treatment (IHE, 2008). Furthermore, this study is applied to calculate the economic impact of a disease (Mielck, 2014). In recent years, the health-related quality of life measurement is used to determine the health status of the population within a region (Skevington, 2004; Romero, 2013).

The development of health-related quality of life studies has led to the development of health-related quality of life instruments making. Until now, there are about 1,000 instruments for measuring the health-related quality of life (Theofilou, 2013). There are instruments for health-related quality of life which are very specific to certain disease, such as The Kidney Disease Quality of Life (The KDQOL), Minnesota Living with Heart Failure Questionnaire (MLHFQ) until the

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instrument which are general and can be used in all conditions such as WHOQOL-BREF, Sort Form 36 and EUROQOL / EQ5D.

Research for health-related quality of life using the instrument WHOQOL-BREF in 24 countries shows that on average, the highest health-related quality of life score is in the physical domain (16.2 (SD 2.9) out of 20) and the lowest is in the environmental domain (13.5 (SD 2.6) out of 20). Meanwhile, countries that have the highest health-related quality of life scores in all domains are the Netherlands (18.3 physical, 16.6 mental, 15.8 social and 15.9 environmental) (Skevington, 2004).

In Indonesia, the measurement of the health-related quality of life uses the concept of the International Classification of Functioning, Disability and Health (ICF) (Pradono, 2009). ICF is one of the international classifications developed by the WHO which consists of health-related domains. One objective of the development of the ICF is to measure the health status of the population (WHO, 2007). Therefore, the concept is included in the Basic Health Research (Riskesdas) carried out by the Research and Development of the Ministry of Health. The concept of ICF in Riskesdas is implemented with the instruments WHO Disability Assessment Schedule (WHODAS) II, consisting of domains such as daily activities, understanding and communication, mobility, self-care, interact with people around and participation in society, and is equipped with 3 items of assistance (Isfandari , 2009).

In 2007, there are 31.9% of Indonesia's population over 15 years who have the poor health-related quality of life and this number has doubled from 2003 (15%) (Pradono, 2009). WHO (2000) has reported that 7.6% of Indonesia's population has poor health-related quality of life, characterized by a score of more than 19.4 disabilities, and nearly half of Indonesia's population (42.4%) have mild disability (score <19.4).

At the provincial level, Gorontalo Province has the highest disability score (31.85) as compared to the national average of 25.24. And the provinces with the lowest score of disabilities are in Java Island, namely Yogyakarta (17.05) and Jakarta (17.92). From six provinces in Java island, Central Java is the province with the highest disability score (26.94) followed by East Java Province (24.97) (Kemenkes, 2013). The higher the disabilities score (max 100) shows a high degree of disability. This figure implies that the health-related quality of life in the region is still poor since the average population has a disability in medium level.

The low health-related quality of life will have an impact on the welfare of the population. The region which has low health-related quality of life will lead to lower productivity of society and the high cost of health care. It is then correlated with the level of the economy and welfare of the region. Therefore, measurement of the health-related quality of life is needed to determine the functioning extent in society (Isfandari, 2009). In the elderly population, quality of health life can predict mortality (Setiati, 2011).

There are many factors which affect the health-related quality of life of an individual. Pradono (2009) states that the health-related quality of life is not only influenced by individual factors, but also by contextual factors, such as the environment. Environmental factors that affect the health-related quality of life consist of shelter, home and environment as well as access to health services. Individual factors that influence the health-related quality of life consist of age (Pradono 2009; Valenti, 2013), gender (Pradono 2009; Setiati 2011; Valenti, 2013; Zashikhina, 2014), education (Mielck, 2014), employment and risk behavior (Pradono 2009), injury (Sudaryo, 2012), the ownership of Health Safety assurance (Pradono, 2009), history of non-communicable diseases (Setiati 2011; Pradono 2009; Zashikhina, 2014; Mielck, 2014), depression and nutritional status (Setiati , 2011).

The risk of decreased health-related quality of life of is greater following the age. Studies of health-related quality of life in older age groups in the United States shows that the older group (> 72 years old) are at greater risk to have poor health-related quality of life than the younger group (60-71 years old) (OR 1.39; 95 % CI 1.07 to 1.80) (White, 2009). Relatively low health-related quality of life (particularly on the physical component) risk occurs in the group of the population aged over 80 years old (OR 2.62; 95% CI 1.33 to 5.14) and 75-79 years

old (OR 2.36; 95% CI 1.21 to 4.59) as compared to the age group 65-69 years old (Tajvar, 2008). In Indonesia, the groups aged over 65 years old have a lower quality of life health three times higher than those of less than 65 years (75.5% vs. 27.8%) (Pradono, 2009).

Consistent results are also found in other health determinants of quality of life, namely gender. Women have higher risk to have a lower health-related quality of life than men in all conditions. In general condition, Indonesian women's risk for having low health-related quality of life is 1.3 times higher likely than men (OR 1.3) (Pradono, 2009). In the elderly population, women who have lower health-related quality of life is 65.5% higher at risk than men (OR 1.9; 95% CI 1.0 to 3.6). The same thing occurs in conditions after the disaster, based on linear regression analysis, there is a significant relationship between gender and all domains of health-related quality of life (physical domain: Beta 1.320; domain psychological: 1.169; the social domain; Beta 0.449; and domain environment: Beta 1.771) (Ardalan, 2011).

The other variable that affects the health-related quality of life is a history of non-communicable diseases (NCDs). NCDs patients need a lot of health care resources because it can threaten patients' health and quality of life (Lam, 2000). Study in Western Australia (Crouchley, 2007) states that individual who has one of NCDs, such as heart disease, stroke, diabetes, asthma, respiratory disease, arthritis and osteoporosis, has a poorer health-related quality of life score as compared with individual who does not have a history of NCDs. Among the non-communicable disease, heart disease causes health-related quality of life with lowest scores (Mielck, 2014).

Setiati (2011) mentions that in the elderly population in Indonesia, the number of NCDs will increase the risk of people to have a low health-related quality of life (OR 3.6; 95% CI 1.9 to 6.8). A research in China mentions that hypertension and osteoarthritis increase the risk of decline in physical health-related quality of life by 1.72 and 1.79 times higher than those who do not suffer the disease (Lam, 2000). These data indicates that a history or condition NCDs is sufficiently important variable that affects the health-related quality of life of an individual.

NCDs trend in Indonesia has increased. Some types of NCDs, such as diabetes mellitus, hypertension and stroke have increased in 2013 as compared with 2007 (Kemenkes, 2013). In East Java, the prevalence of asthma, cancer, hypertension, stroke, kidney failure and joint diseases are higher than the average national prevalence and the 10 provinces with the highest prevalence of non-communicable disease in Indonesia.

In addition to high prevalence of NCDs, East Java Province is also a disaster-prone province. National Disaster Management Agency (BNPB) shows that the index scores of disaster-prone province of East Java is 189 and is put into the category of regions with high vulnerability to disasters (BNPB, 2011). Among the regencies/cities in East Java province, Kediri is one area that has the highest index of disaster-prone areas.

People living in disaster-prone areas are at risk of having low health-related quality of life. The results of the study is drawn after the Wenchuan earthquake in China research says that the health-related quality of life of the population in the region living in the most affected areas by the earthquake has a significantly lower quality of life scores as compared to populations residing in areas which re less affected by the earthquake (Wen, 2012).

The study of the relationship between health-related quality of life and NCDs has been done, particularly in the Western population. However, the measurement of the health-related quality of life in Southeast Asia is still rare (Lam, 2000) especially, the health-related quality of life studies in populations living in disaster-prone areas. Therefore, this study is conducted in Kediri, East Java, which is prone to catastrophic volcanic eruption. In addition, the study tries to investigate the effect of several non-communicable disease suffered by the individual which also has never been done. Likewise, the study concerns to the groups which will have the most association with low health-related quality of life.

Method

This research was conducted in Kediri,

East Java, which in 2013 had a population of 1,603,041. In this region, there is Kelud Volcano which is one of the most active volcanoes in Indonesia. The Baseline of Indonesia Volcanology (BNPB, 2012) in the 20th century, there had been five times volcanic eruption in Kelud, namely in 1901, 1919, 1951, 1966 and 1990. The characteristics of the eruption that occurred were in the form of discharge of hot smoke, ash and tephra, which caused cold lava (BNPB, 2012).

This study was a follow-up analysis from the Basic Health Research (Riskesdas) in 2013 using a quantitative approach of cross-sectional study design. A cross-sectional design could describe the health status at the time of observation. This was consistent with one of the goals of this study which was to see the picture of health in the population's quality of life in the disaster-prone areas of Kediri, East Java. From this research, it could be seen that the average health-related quality of life score and the prevalence of people who had the low quality of life.

To identify risk factors of an outcome that was chronic, cross-sectional study was used. The health-related quality of life outcomes was a condition of chronic nature due to the changes occurring in quite a long time, ranging from a few months (Sudaryo 2012, Goenjian, 2011) to five years (Ardalan, 2011).

The research population was the population residing in volcanic-prone areas of Kelud in Kediri. In 2014, Kelud volcano erupted pyroclastic material catapult up to an altitude of 17 km and up to the area of Garut, Bandung and Tasikmalaya, West Java. It made changes in disaster-prone areas in 2012 which was prepared based on Kelud Volcano effusive eruption in 2007 (BNPB, 2012). Based on the latest mapping of disaster-prone areas, after the eruption of Kelud volcano in 2014, the division of the territory was divided into regions with security levels high, medium and low. The categories were made by thick sediment pyroclastic material and diameter size pumice.

The samples were individual respondents Riskesdas 2013 in Kediri Regency who had the inclusion criteria: those who were 18-65 years old and had complete data. The sample size used in this study referred to the minimum sample size which was calculated based on the formula of the samples test the hypothesis by using a significance different proportion of 95% and 90% power studies. The proportion P1 was amounted to 0.16 (Setiati, 2011), and P2 amounted to 0.145 (Agborsangaya, 2013). From the above calculation of the samples, minimum of 1560 samples were obtained. Method of sample collection was done by total sampling of all the data collected in accordance with the Riskesdas inclusion criteria.

Health-related quality of life was defined as the absence of health disabilities/disorders in performing daily activities, which were implemented through 12 questions in Riskesdas and were filled using a Likert scale of 1-5 (no disturbance to strongly disturbed). The answers of all questions were summed up to obtain a rude score. Then, the scores were transformed into a 0-100 scale with the calculation (score coarse / 60) * 100. The health-related quality of life is good if the score is <19.4 and the health-related quality of life is poor health if the score is ≥ 19.4.

NCDs history was defined as the respondents who had ever been diagnosed or had symptoms of a chronic disease (asthma / COPD, cancer, diabetes mellitus, hyperthyroidism, hypertension, coronary heart disease, heart failure, kidney, joint disease / arthritis, stroke). The age of respondents was categorized based on the cut-off point of 55 years old because the Indonesian Ministry of Health said that this age was a boundary between the adult and the elderly. Education was categorized into higher education if the respondent had successfully completed college education / diploma / undergraduate / graduate. The rest of the education was categorized into low / medium. Socio-economic status was seen by quintile where quintile 1 indicated the lowest socioeconomic status and quintile 5 referred to the highest socioeconomic status. Residential areas were categorized into city and village.

The data analysis was performed by multivariate analysis that aimed to control the confounding variables so the adjusted relationship between history of NCDs and health-related quality of life in Kediri Regency could be measured. In univariate analysis, all variables were observed in frequencies

and percentages for each category. Then, the researchers performed bivariate analysis. Because of all the variables are categorical data, the analysis was performed using analysis of chi square to know the relationship between the independent variable (a history of communicable diseases) and confounding variables (age, gender, education, socio-economic and geographic aspects) with quality of life health. Then, multivariate analysis was conducted to determine the true relationship between history of NDCs with health-related quality of life after being controlled by some confounding variables. A variable was called as confounding variables when Δ POR (Prevalence Odds Ratio) was more than 10% which was calculated by the following formula:

$$\Delta POR = \frac{PORcrude - PORadj}{PORcrude} x\ 100\%$$

If Δ POR was > 10% then the variables were still included in the model and the value that would be seen/interpreted was POR and the model which were modified using confounding variables.

Results and Discussion

Based on the study inclusion criteria, the samples of Riskesdas data which are included in the analysis are as many as 1872 samples. Further screening for completeness of data is conducted. In all the observed variables, the data is comprehensive. So in the end, all 1872 samples are still included in the analysis.

The poor health-related quality of life is experienced by 7.7% of respondents. About one-fifth of respondents have a history of chronic disease and as many as 5.0% of respondents have two or more chronic diseases. Among the chronic diseases, hypertension (8.7%), asthma (7.3%) and joint disease (6.9%) disease are the most common.

Respondents who have a history of non-communicable diseases are significantly at risk for poor health-related quality of life six times greater than those who do not have a history of non-communicable disease (OR 5.987; 95% CI 4.210 to 8.514). The risk of poor health-related quality of life is increased to about 12 times in those who have more than 2 NCDs (OR 12.109; 95% CI 7.354 to 19.938) as shown in Table 2.

Table 1. Overview of Health-related quality of life and History of Communicable Diseases in Kediri Regency

Variables	f	%
Health-related quality of life (n=1872)		
Good	1728	92,3
Poor	144	7,7
History of NCDs (n=1872)		
No	1469	78,5
Yes	403	21,5
Non Communicable Diseases		
Asthma (n=1872)	137	7,3
Cancer (n=1872)	4	0,2
Diabetes Mellitus (n=1872)	35	1,9
Hyperthyroid (n=1872)	10	0,5
Hypertension (n=1872)	162	8,7
Coronary Heart Disease (n=1872)	10	0,5
Hearth failure (n=1872)	3	0,2
Kidney stone (n=1872)	13	0,7
Joint sickness (n=1872)	130	6,9
Stroke (n=1872)	23	1,2
The number of obtained NCDs (n=1872)		
none	1469	78,5
1 disease	310	16,6
≥2 diseases	92	5,0

Source: Riskesdas Data 2013

From 10 non-communicable diseases which are observed, five diseases have a prevalence of over one percent in Kediri Regency namely shortness of breath / asthma, diabetes mellitus, hypertension, joint disease and stroke. All of these diseases have a significant association with an increased risk of poor health-related quality of life. Stroke is the highest disease in quality of life increasing the risk of poor health (POR 25.000; 95% CI 10.406 to 60.063). Respondents who are suffered from stroke have 96% higher risk to experience the poor health-related quality of life as compared to the respondents who do not suffer a stroke (Table 2).

After being controlled by some confounding variables such as age, gender,

Table 2. The Bivariate Analysis of NDCs History with Health-related quality of life in Kediri Regency

		Health-related quality of life				POR	Pv
		Poor	%	Good	%	95% CI	
NCDs History	Yes	83	20,6	320	79,4	5,987	0,000
	No	61	4,2	1408	95,8	(4,210-8,514)	
Number of NCDs	1 disease	51	16,5	259	83,5	4,545 (3,063-6,745)	0,000
	≥ 2 diseases	32	34,4	61	65,6	12,109 (7,354-19,938)	0,000
	No disease	61	4,2	1408	95,8	Ref	
Shortness of Breath/ Asthma	Yes	29	21,2	108	78,8	3,783	0,000
	No	115	6,6	1620	93,4	(2,408-5,941)	
Diabetes Mellitus	Yes	11	31,4	24	68,6	5,872	0,000
	No	133	7,2	1704	92,8	(2,815-12,248)	
Hypertension	Yes	40	24,7	122	75,3	5,063	0,000
	No	104	6,1	1606	93,9	(3,365-7,617)	
Joint Disease	Yes	24	18,5	106	81,5	3,060	0,000
	No	120	6,9	1622	93,1	(1,893-4,947)	
Stroke	Yes	15	65,2	129	7,0	25,000	0,000
	No	8	34,8	1720	93,0	(10,406-60,063)	

Source: Riskesdas Data 2013

education, economic status and region of residence, the risk of having the poor health-related quality of life becomes 5.581 in those who have a history of NCDs (PORadj 5.581; 95% CI 3.883 to 8.020).

The limitations of this study is the unavailability of baseline data that can be compared with the data obtained at this time, so that the study cannot measure changes in the health-related quality of life, especially the health-related quality of life before the disaster. In 2007, Kelud Volcano in Kediri Regency experienced effusive eruption which caused massive impact. Kelud Volcano is an active volcano which has undergone several large enough eruptions within the last 25 years.

Additionally, another limitation which is associated with the study design in Riskesdas is the use of cross-sectional study design. This design does not have a good ability of temporality. This means that between the observed exposure and outcomes cannot be clear analyzed whether the exposure occurs precedes the outcome (health-related quality of life) so that causality could not be clearly known.

This study uses the prevalence of health-related quality of life. The use of prevalence rate is considered quite appropriate because the health-related quality of life is an outcome change that can be observed in a considerable period of time. A research conducted by Sudaryo (2012) has examined the health-related quality of life six months after the earthquake in Padang. Meanwhile, Valenti (2012) has measured the health-related quality of life after the earthquake of L'Aquila in Italy 24 months after the disaster. Ardalan (2011) even observes the health-related quality of life role in a longer period of time, which is five years after the Bam earthquake disaster in Pakistan. Until now, the information related to the right time in assessing the post-disaster health-related quality of life has not been discovered

Tabel 3. Relationship of NCDs History with Health-related quality of life after being controlled by some Variables in Kediri Regency

		B	OR 95%CI	Pv
NCDs History	Yes	1,719	5,581	0,000*
	No		(3,883-8,020)	
Age	>55 years old	0,879	2,408	0,000*
	≤55 years old		(1,631-3,554)	
Gender	Female	0,107	NA	0,567
	Male			
Education	Low/Medium	-1,070	0,343	0,009*
	High		(0,153-0,768)	
Economy status	Quintile 1	0,715	NA	0,074
	Quintile 2	0,999	2,715	0,005*
			(1,347-5,471)	
	Quintile 3	0,775	2,170	0,030*
			(1,077-4,372)	
	Quintile 4	1,089	2,970	0,003*
			(1,466-6,016)	
	Quintile 5		Ref	
Region of Residence	Urban	-0,116	NA	0,540
	Rural			

Source: Riskesdas Data 2013

clearly. This research is carried out six years after the incident. Several studies (Ardalan, 2011; Papanikolaou, 2012) state that the change of health-related quality of life can be observed in the long term after the disaster.

These studies suggests that as many as 7.7% of the population in Kediri Regency have low health-related quality of life. The categorization in health-related quality of life is based on interference, minimal light interference and on points to questions that consist of physical activity, mental and social conditions. This result is not much different from the health-related quality of life of the Indonesian people in general. Riskesdas 2013 shows that 91.7 percent of Indonesia's populations do not have disability experiences (good health-related quality of life). These results are higher than the research done by Agborsangaya (2013), in the general population in Alberta, Canada which states that an average of 78.56 inhabitants do not have a problem with the dimensions of mobility, self-care, daily activities, pain / discomfort and depression / anxiety.

Basically, the quality of life is measured by the health of the individual's perception on life they live (Skevington, 2004). The low prevalence of the poor health-related quality of life in this population is possibly because most of the populations come from Javanese culture with a typical character of "*Narimo ing pandum*" which means they have the attitude to let their life goes with all the decisions determined by God. They also believe that this life has been destined so they must not be too ambitious. It is also applied in facing catastrophic conditions and living in disaster-prone areas, they accept it as fate.

The result of this study states that people who have history of at least one type of NCDs run the risk six times more likely to experience the poor health-related quality of life (POR 5.581; 95% CI 3.883 to 8.020). This study confirms the results of other studies (Agborsangaya, 2013; Mielck, 2014; Lam, 2000) related to the impact caused by non-communicable diseases. In the adult population in developed countries, such as Germany, the effect of NCDs history on health-related quality

of life is only by 1.28 times (Mielck, 2014). This is because of the differences in patterns of prevention and control of NCDs in developed countries and developing countries. Residents in these countries have fairly high awareness for not doing risky behavior which causes NCDs, such as smoking, proper diet, physical activity and alcohol abuse. In people who have non-communicable diseases, physical activity done will be greatly decreased the health problem. As reported by Kumar (2014), 72.1% of patients with communicable diseases are not doing physical activity. This causes the NCDs sufferer's quality of life is lesser. Conditions of NCDs quality of life of the patient can be improved with proper care, such as dialysis activities in the framework of the treatment of kidney disease in hospitals Semarang which can improve health-related quality of life scores in all domains of health quality of patient life including their physical, psychological, social and environmental domains (Widowati, 2011).

Some of the variables that are expected as confounders are controlled to determine the true relationship between NCDs and health-related quality of life. The attempts to avoid the existence of these confounders are to do randomization, restriction and matching in the design development phase of the study. However, such efforts cannot be done on a cross-sectional study design. Randomization is only done for experimental studies, whereas restriction and matching require information on potential population, which in this study is difficult because it uses secondary data. In the cross-sectional study, regular efforts which are made to control confounders are at the stage of analysis, namely by performing multivariate analysis. Multivariate analysis shows that being confounders of this study are age, gender, education, economic status, and region of residence.

Age is a confounding variable on the relationship between NCDs history with health-related quality of life. The risk of decreasing quality of life is greater as the age is increasing. These results are consistent with the study of health-related quality of life in older age groups in the United States (White, 2009), in Tehran, Iran (Tajvar, 2008), and in Indonesia (Pradono, 2009). In older age groups, the prevalence of the disease has increased and every individual in the group of elderly usually have several diseases at once (multi-morbidity). This will certainly affect the health-related quality of life which also includes the ability to perform daily activities, health care utilization and mortality.

Another variable that becomes confounder between NCDs history and health-related quality of life is gender. Gender is a confounder because it has a relationship with a NCDs history and health-related quality of life. Women have a lower risk for hypertension. This is because women have higher level of awareness, treatment and control of hypertension than men. In addition, women have estrogen hormone which has a protective effect on the incidence of hypertension (Doumas, 2013). Women have a higher risk to have a low health-related quality of life than men in all conditions. In general condition, Indonesian women's risk for having low health-related quality of life is 1.3 times more likely than men (OR 1.3) (Pradono, 2009). Women have a lower health risk of life quality due to the influence of estrogen on the activities of the oxytocin receptor. This hormone affects the thickness of the left medial prefrontal cortex. The thinner the cortex, one's social abilities will be decreased which would disrupt the health-related quality of life of an individual (Sprangers, 2014).

The relationship between the NCDs history with health-related quality of life is also plagued by level of education. Based on the research result by Mielck (2014), there is a difference in health-related quality of life scores which are quite significant to those who come from low and high educated groups. The higher the education levels of individuals, the greater the health-related quality of life scores is. Nedjat's Research (2011), in general population in Iran, shows a significant difference between the scores in every category of education. At the condition of 21 months after the earthquake in Taiwan's villages, education has no significant relationship with all domains of health-related quality of life (Chou, 2004). As reported by Lam (2000), people with low education levels suffer more NCDs. With low education, the exposure to the promotion, especially communicable disease, such as risk factors, symptoms and signs, and treatment is very limited.

Another confounder which can disturb the relationship NCDs and health-related quality of life is socio-economic. Research from Pradono (2009) in general population in Indonesia, shows that the prevalence of poor health-related quality of life among those from high socioeconomic is significantly lower than those who come from low socioeconomic groups. Individuals with higher incomes also have higher health-related quality of life scores (Zhao, 2013). In Singapore, individuals with income of SGD 6,000-9,999 and > SGD 10,000 have significantly high health-related quality of life scores as compared to individuals with income only < SGD2,000 (Leow, 2013). The risk of experiencing poor health status is significantly higher in those with income < $ 15,000 (OR 4.47; 95% CI 1.63 to 12.26) and income of US $ 15,000-24,999 (OR 3.37; 95% CI 1.22 to 9.33) than those who earn ≥ $ 100,000 (Ruggiero, 2009). Individuals with low incomes have little sense in maintaining health, so that individuals in this group have a double burden: a high risk of experiencing health problems which in the end will decrease the health-related quality of life (Mielck, 2014).

A similar pattern also occurs on variable of residence. City residents have significantly lower risk for experiencing the poor health-related quality of life than village residents (Pradono, 2009). Sedentary life style which is mostly done by the city residents lead to an increased incidence of NCDs that ultimately affects the health-related quality of life of the population. The lifestyle risk is lack of physical activity, where 70% of the residents' time is spent in a sitting position, and 30% only do light activity. No time or just a little time is used for the exercise. Sedentary lifestyle like this, based on a study conducted by Owen (2010), leads to central adiposity (as indicated by the increasing size of the waist) and fasting triglyceride levels. Long sitting position also causes reduced skeletal muscle contractions that can result in decreased activity of lipoprotein lipase and triglycerides, reducing oral glucose load and reduced glucose-stimulated insulin secretion (Hamburg, 2007).

According to this study, the disease that affects the health-related quality of life most is stroke disease. Based on the CDC, this is related to the cost and side effects of treatment, affordability of care, access to good services and issues concerning the caregiver and the family (CDC, 2003). In addition to the risk, stroke will affect patients' daily activities 1.9 times greater than those who do not experience a stroke (Lam, 2000). Meanwhile, in the adult population in Alberta, Canada, the risk of a stroke patient's in experiencing disturbance to do their daily activities 2.4 times higher as compared to non-sufferers of stroke. Similarly, the population in West Australia shows that the health of patients' health-related quality of life scores is significantly lower in stroke patients than non-sufferers, and the low score occurs on the dimensions of physical function (Crouchley, 2007).

Conclusion

In disaster-prone population, the history of non-communicable diseases had a significant relationship with health-related quality of life. The disease which affects the declining health-related quality of life the most is stroke. In disaster-prone populations like in Kediri Regency, the burden of non-communicable disease prevention becomes greater because in addition to improving the quality of life of population health, it can also be useful to improve the population's ability to cope with disasters. Therefore, the researchers suggest that promotion and prevention of NCDs can be integrated with activities related to mitigation and increase community resilience to disasters.

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